THE SPROUTING OF COCKLEBUR SEEDS.

E. E. MASTERMAN.

In July, 1896, Dr. E. W. Claypole, then of Buchtel College, Akron, Ohio, asked me how general was the belief that one seed of the cocklebur grew one year and the other the next year or later. Inquiry of about twenty of the older residents resulted in procuring no information touching the same. In 1897, I was told by a German farmer that one seed only grew one year and the other later, never both at the same time. A short time after I noticed the statement of A. D. Selby in Bulletin 83, (page 353) Ohio Experiment Station, as follows: "Prof. Arthur has recently shown that only one of these seeds can be caused to germinate the first year, the other always remaining until the second year." This was a confirmation of the German's claim, yet I determind to investigate for myself.

I carried on the experiment for three years with the following results:

In 1898, I planted 1000 burs; 917 grew two plants to the bur.
In 1899, I planted 1000 burs; 921 grew two plants to the bur.
In 1900, I planted 1000 burs; 913 grew two plants to the bur.
Total three years, 3000 burs; 2751 grew two plants to the bur.

Of the remaining 249 burs some grew one plant, some none; some had one, some had two apparently sound seeds. I regret that no further notice was taken of these seeds. The *only* object was to determine whether the two seeds *could* be made to grow at the same time. An account of the work was sent to Professor Selby, asking whether further experiment was necessary; he replied that he thought not.

Perhaps it should be added that I selected only apparently sound burs; soil was taken from a field near a creek where cockleburs grow abundantly. It was passed through a ¼ inch-mesh wire sieve, and carefully searched over with the aid of a glass. This soil was taken to a distant part of the farm; in it the seeds were planted and nature did the rest.

I also made observations as follows: I searched among specimens growing for a mile along a creek, for two plants growing together and not nearer than five inches to any other plant. Of the 1500 specimens examined each year for three years, two plants always grew from one bur.

Why have I obtained such opposite results as compared with Professor Arthur's? Can it be referred to locality, soil, or some other more favorable conditions?

The substance of the above was presented, December 27, 1900, to the Ohio Academy of Science and it provoked a discussion in which Professors Kellerman, Schaffner, Mosely and others participated. Dr. Kellerman thought that the results of Arthur's experiments were perhaps more nearly in accord with what usually takes place in nature. He pointed out the mistake of quoting or saying that Arthur has shown "that only one of the seeds can be caused to germinate the first year." Turning to the printed report of the experiments in question (Proc. 16th, An. Meeting Soc. Prom. Agr. Sci., 1895), I find that, based on many experiments made previous to 1895, he gives the result in round numbers as follows: "Out of every hundred ordinarily well formed cockleburs, seventy will produce one seedling each, and five two seedlings each the first year after maturity; the remaining twenty-five will for various reasons fail to grow. Thirty of the hundred will produce seedlings the second year after maturity, five will produce seedlings the third year after maturity, and two or three seedlings will be produced in subsequent years.

Later experiments by Dr. Arthur seemed to show a lower percentage of cases of the sprouting of both seeds to the bur in one season. In the summary he states: "The germination of both seeds of a bur of Xanthium in one season is exceptional."

In view of the above and in accordance with the suggestions of others I purpose continuing my experiments relative to this subject.

The following interesting statement is made by Dr. Arthur, in the report cited, touching the cause of the difference in the action of the two seeds; he says it "appears to be constitutional; a hereditary character residing in the protoplasm of the embryo."

New London, Ohio.